

# Topic planning Level 7 Chemistry 2012

Topic / context Structures of Matter with Heat



Focus question for this topic  
Why does matter occur in different forms?  
Explain changes in energy with matter changes



The key concept / big chemistry idea students will take from this topic  
Matter is made from different particles (eg atoms, molecules, atoms) and how they bond / arranged give rise to the variety of substances in the environment  
All changes involve an energy change



Achievement objectives (e.g. MW 7.1, NOS 7.3)

M.W 7.2  
NOS 7.1 7.2 7.3



Values relevant to this topic (link to actual learning objective overleaf).

Values 1: Innovation, inquiry and curiosity



Key competencies relevant to this topic (link to actual learning objective overleaf).

KC 1. Thinking  
2. Using language, symbols, text  
3. Managing Self  
4. Relating to other

Prior knowledge required

Particle theory  
Bonding -  
Atomic Structure

Chemical / Physical Change



Progression (what are the pre-requisites for the related Level 3 topic?)

Thermochemical changes  
Structure & bonding



Cross curricula links (what other subject(s) could this topic link to?)

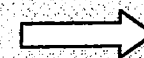
Maths  
Geology  
Physics  
Technology



Science vocabulary (key terms for this topic)

Exothermic  
Endothermic  
polar / non-covalent  
ionic  
metallic  
molecule  
ion  
network  
macromolecular  
enthalpy  
crystals  
Van der Waals  
Intermolecular  
Intramolecular  
Electronegativity  
Lewis Diagrams

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## Learning objectives

At the end of this topic, students can:-

- Identify, compare describe ionic, covalent, & metallic bonding
- Describe intermolecular forces
- Draw Lewis Structures and describe shape
- Predict polarity of comp with justification
- Compare and contrast molecular, ionic, covalent networks and metallic
- Identify exo & endothermic reactions
- Explain changes of state at particle levels
- Describe enthalpy changes in bond-making and bond-breaking
- Calculate energy changes & balance equations
- Describe  $\Delta_r H$
- ~~Retat~~ Describe physical properties and relate to solid type
- Describe ductility, malleability, conductivity, mp+bp solubility in terms of particle make-up

## Teaching and Learning strategy

To enhance student learning, the following strategies will be used:-

- Group Practical Values 1: KC 1, 3
- Teacher Demo's Values 1: KC 1, 3
- Group discussion & report back V1: KC 1, 3, 4
- Card Matching - Key terms
  - Telephone Whispers
  - Structure with property
- Cause - effect - reason
- Model Making - and designing

### Student resources / ICT

YouTube videos  
Workbook  
Best choice website

### Assessment

AS 91165 2.5 External.  
Progress tests

### E-mail addresses

# Topic planning Level 7 Chemistry 2012

Topic / context Hydrocarbons / Fuels



Focus question for this topic

1. Identification of hydrocarbons
2. What are the properties of H.C.
3. What are the reactions of H.C.



The key concept / big chemistry idea students will take from this topic

- Hydrocarbons are the building blocks of fuels and by-products eg plastics
- These have effects on the <sup>society,</sup> ~~environment~~ both environmental & economic.



Achievement objectives (e.g. MW 7.1, NOS 7.3)

MW 7.4

NOS 7.3, 7.4

MW 7.1, 7.2, 7.3



Values relevant to this topic (link to actual learning objective overleaf).

- Ecological Sustainability
- Innovation, inquiry and curiosity



Key competencies relevant to this topic (link to actual learning objective overleaf).

- Thinking
  - Language Symbols & text.
- ALL 1-5.

Prior knowledge required

- chemical reactions
- ~~atomic structure~~ • atomic structure & bonding
- Write equations & formula
- halogens.



Progression (what are the pre-requisites for the related Level 3 topic?)

- Basic physical/chemical properties of hydrocarbons
- Naming



Cross curricula links (what other subject(s) could this topic link to?)

- English → writing explanations to show understanding
- Geography → Fuel exploration/extraction.
- Maths → writing & balancing chemical equations.
- Technology → production of textiles/products.

Science vocabulary (key terms for this topic)

- |                           |                      |
|---------------------------|----------------------|
| • Addition                | • monomer            |
| • Substitution            | • polymer            |
| • Isomers                 | • bromination        |
| • Cis/Trans               | • Markovnikov's Rule |
| • combustion - Complete   | • Cracking           |
| • combustion - Incomplete | • Crude oil          |
| • Alkanes/ene/ynes        | • natural gas        |
| • Hydrocarbon             | • oil refinery       |
| • solubility              | • Asymmetry          |
| • Polarity                | • Functional Groups  |
| • Polymerisation          |                      |

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## Learning objectives

At the end of this topic, students can:-

- Name Alkanes, Alkenes, Alkynes. using IUPAC.
- Distinguish saturated & unsaturated hydrocarbons.
- Draw structural formulae
- Identify structural & geometrical isomers and name them
- Describe & explain physical properties including solubility, physical states, conductive.
- Give examples of and explain chemical rxns including complete/incomplete combustion, addition & substitution reactions. <sup>oxidation</sup> ~~oxidation~~:  
 ↳ inc major/minor products.
- describe formation of addition polymers & describe terms monomer, polymer & polymerisation, & be able to identify the monomer in a polymer.
- Explain how hydrocarbons are used in society.

## Teaching and Learning strategy

To enhance student learning, the following strategies will be used:-

- Moly mods - construct models of common H.C.
- Group Practicals - Bromination & ~~KMnO<sub>4</sub>~~ KMnO<sub>4</sub>.
- Relate to nutrition & terms commonly heard eg mono unsaturated fats
- Group Practical & teacher demonstration  
 → link to prior knowledge of structure & bonding
- Relate to everyday polymers poly styrene, Teflon etc.
- Research & Presentation

### Student resources / ICT

- moly mods
- chemicals
- Internet

Assessment 9/10 9/11/65 2.5.

E-mail addresses

# Topic planning Level 7 Chemistry 2012

Year 12

Topic / context Environmental Chemistry / Air pollution



Focus question for this topic Where are we getting it from and what is it used for? where does it end up?



The key concept / big chemistry idea students will take from this topic  
 Traditional fuels  
 Alternative fuels (e.g. OH, plastics)  
 Society uses and demands.  
 Justification of uses.



Achievement objectives (e.g. MW 7.1, NOS 7.3)  
 MW 7.1, 7.2, 7.3  
 NOS 7.3, 7.4



Values relevant to this topic (link to actual learning objective overleaf).  
 - Ecological sustainability  
 - Inquiry



Key competencies relevant to this topic (link to actual learning objective overleaf).  
 - Thinking  
 - Managing self.  
 - Language, symbols & texts

Prior knowledge required  
 - Energy (Respiration and Photosynthesis)  
 - Basic bonding and atomic structure  
 Basic hydrocarbon structure  
 Combustion products - complete  
 - incomplete



Progression (what are the pre-requisites for the related Level 3 topic?)  
 Good understanding/prior knowledge of organic compound structure and bonding and associated reactions due to different functional groups. Physical and Chemical (of the) properties.



Cross curricula links (what other subject(s) could this topic link to?)  
 Health, Biology, Economics, Maths, English.



Science vocabulary (key terms for this topic)  
 Alkanes - Fractional distillation/Reflux  
 Alkenes - Fossil Fuels  
 Alkynes - Combustion (complete and incomplete)  
 Halo alkenes - Organic!!  
 Alcohols - Hydrocarbons  
 Carboxylic Acids - Polarity  
 Esters - Solubility  
 Polymers/monomers - Boiling points  
 Isomers - Melting points  
 Isomers Isomers  
 Geometric isomers  
 Combustion  
 Addition  
 Substitution  
 Oxidation  
 Polymerisation  
 Hydrolysis  
 Saponification  
 Hydration  
 Hydrogenation  
 and formulae

## Learning objectives

At the end of this topic, students can:-

- 1W 7.1 - ~~Indicators~~  
bullet point; 4, 5, 6, 8, 9, 10, 12.
- 1W 7.2 - Indicators  
bullet point; 3, 4, 6, 7, 10, 11, 12.
- 1W 7.3 - Indicators  
bullet point; 1, 2
- 10S 7.1 - Indicators  
bullet point; 1, 4, 5, 6,
- 10S 7.2 - Indicators  
bullet point; 3, 6,
- 10S 7.3 - Indicators  
bullet point; 1, 2, 3, 4, 6, 7,
- 10S 7.4 - Indicators  
bullet point; 5, 6.

## Teaching and Learning strategy

To enhance student learning, the following strategies will be used:-

- Individual research
- Building models
- Group practicals
- Teacher demo's
- Class discussion
- Thinking Activities
- Backward strategies.

Student resources / ICT

Assessment

(2.3  
AS 91163) (2.5  
91165)

E-mail addresses

Equilibria  
Rates  
Acids/Bases

## Topic planning Level 7 Chemistry 2012

Topic / context

EQUILIBRIA



Focus question for this topic



The key concept / big chemistry idea students will take from this topic

Many Reactions are Reversible.  
Change factors change Equilibrium position.



Achievement objectives (e.g. MW 7.1, NOS 7.3)

MW 7.1  
US



Values relevant to this topic (link to actual learning objective overleaf).

Ecological sustainability - (Earth's Equi systems)



Key competencies relevant to this topic (link to actual learning objective overleaf).

Language symbols & text  
Participating & contributing

Prior knowledge required

Know how to run up & down escalator  
pH reaction rates  
Use Chemical Equations / Symbols



Progression (what are the pre-requisites for the related Level 3 topic?)

Equilibrium constants



Cross curricula links (what other subject(s) could this topic link to?)

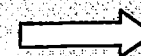
Economics.



Science vocabulary (key terms for this topic)

Reversible  
Dynamic  
Equilibrium constant & Expression  
Strong / weak  
conc / dilute  
pH  
Hydronium ion / proton

PTO



## Learning objectives

At the end of this topic, students can:-

## Teaching and Learning strategy

To enhance student learning, the following strategies will be used:-

2 aquariums filled by beakers.

Student resources / ICT

Assessment

E-mail addresses

# Topic planning Level 7 Chemistry 2012

Topic / context Bonding, structure & energy.



Focus question for this topic

How does the structure of chemicals <sup>①</sup> affect reactivity?  
How is energy linked to bonding? <sup>②</sup> affect physical properties?



The key concept / big chemistry idea students will take from this topic

what holds chemicals/substances together.  
why substances exhibit the properties they have  
Looking below the 'surface'



Achievement objectives (e.g. MW 7.1, NOS 7.3)

MW 7.1, MW 7.2, NOS 7.1, NOS 7.3,



Values relevant to this topic (link to actual learning objective overleaf).

inquiry, excellence  
curiosity,



Key competencies relevant to this topic (link to actual learning objective overleaf).

\* thinking, managing self,  
\* Using language, symbols + text, participating,

Prior knowledge required

electron configuration, periodic table interpretation,  
physical properties of metals



Progression (what are the pre-requisites for the related Level 3 topic?)

Types of bonds, Lewis shapes, polarity, forces, exo/endo,  
manipulating  $\Delta H$  values. periodic trends/energ.



Cross curricula links (what other subject(s) could this topic link to?)

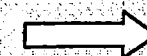
maths - symmetry  
English - discussion literacy



Science vocabulary (key terms for this topic)

covalent / ionic / metallic / network	malleable
Lewis diagram	ductile
electronegativity	conductivity
dipole	solubility
polarity (polar, nonpolar)	stoichiometry
symmetry	moles
intra / inter molecular forces	molar mass
m.p / b.p	
endo / exothermic	
enthalpy	

PTO



## Learning objectives

At the end of this topic, students can:-

Recognise solids can be classified into 4 general types.

Describe different types of bonding

Draw Lewis structures.

Describe molecular shapes

Relate phys. props  
to bonding.

Relate electronegativity of atoms to polarity of  
bonds.

Link shape symmetry to overall polarity

Describe reactions as exo/endo thermic.

calculate energy changes using  $\Delta H$  & stoichiometry

bonding making + bond breaking

## Teaching and Learning strategy

To enhance student learning, the following strategies will be used:-

Student resources / ICT

Assessment

E-mail addresses